

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) An image processing apparatus, comprising:

an image data input unit for inputting image data of a plurality of objects including a main subject;

a range setting unit for restricting a searching range in the depth direction for searching for said main subject from the plurality of objects using the input image data;

a partial image extracting unit for extracting, as a partial image, ~~including said main subject~~ at least a portion of one of said plurality of objects from said image data based on depth distribution information indicating a distance to each of said plurality of objects included in said image data, a depth direction of said partial image being restricted to said searching range set by said range setting unit; and

a main subject detecting unit for receiving main subject information and ~~detecting said main subject from whether~~ said partial image and receiving is said main subject based on said main subject information, wherein

in searching for said main subject from the plurality of objects, said partial image extracting unit extracts first, as the partial image, at least a portion of said one of said plurality of objects that is closest in distance in the depth direction, and

said image data input unit comprises a means for inputting a parallax image, which is generated by capturing one of said plurality of objects viewed from a plurality of different perspectives, and the image processing apparatus further comprises a depth distribution

information receiving unit for receiving said depth distribution information calculated from said parallax image.

Claims 2 - 3 (Canceled)

4. (Currently Amended) The image processing apparatus as claimed in claim 1, wherein said main subject information includes position of a distinctive part; and

said main subject detecting unit comprises:

a distinctive parts detecting unit for detecting ~~from whether~~ said partial image, a is said main subject based the position of the distinctive part, which should be included in said main subject; and

~~an information receiving unit for receiving said main subject information based on the position of said distinctive part detected by said distinctive parts detecting unit.~~

5. (Currently Amended) The image processing apparatus as claimed in claim 1, wherein:

said range setting unit comprises a means for setting a first searching range and a means for setting a second searching range, which differs from said first searching range;

said partial image extracting unit comprises a means for extracting at least a portion of at least one of said plurality of objects included in said first searching range as a first partial image and a means for extracting at least a portion of at least one of said plurality of objects included in said second searching range as a second partial image; and

said main subject detecting unit comprises a means for detecting ~~said main subject from whether~~ said first partial image is said main subject and a means for detecting ~~said main subject from whether~~ said second partial image is said main subject when ~~said main subject is not detected from said first partial image is not said main subject.~~

6. (Original) The image processing apparatus as claimed in claim 5, wherein said range setting unit sets a predetermined depth length as said first searching range and sets the depth length contiguous to said first searching range as said second searching range.

7. (Original) The image processing apparatus as claimed in claim 5, wherein said range setting unit sets the depth length, which includes an independent object existing at the nearest distance, as said first searching range based on said depth distribution information and sets the depth length contiguous to said first searching range as said second searching range.

8. (Currently Amended) The image processing apparatus as claimed in claim 1, wherein said range setting unit divides the depth range that includes said plurality of objects in said image data based on said depth distribution information and sets a plurality of said searching ranges;

said partial image extracting unit extracts from said image data at least one of said plurality of objects included in each of a plurality of said searching ranges as a plurality of ~~said~~ partial ~~image~~ images; and

said main subject detecting unit receives a plurality of said main subject information and detects said main subject from each of ~~a~~ said plurality of said partial ~~image~~ images ~~and receives a plurality of said main subject information~~ images based on said plurality of said main subject information.

9. (Currently Amended) The image processing apparatus as claimed in claim 1, wherein:

said range setting unit sets a different said searching range when said main subject is not detected in said searching range set by said range setting unit;

said partial image extracting unit extracts ~~again said~~ another partial image in said different said searching range; and

said main subject detecting unit detects ~~again~~ whether said other partial image is said main subject.

10. (Previously Presented) The image processing apparatus as claimed in claim 1, wherein said image data input unit is an image capturing unit for picking up an image of said plurality of objects, comprising:

a photographic condition setting unit for setting a photographic condition based on said main subject information; and

an image capturing control unit for controlling imaging by said image capturing unit based on said photographic condition.

11. (Withdrawn - Previously Presented) The image processing apparatus as claimed in claim 1, further comprising:

a processing condition setting unit for setting an image processing condition based on said main subject information; and

an image processor for processing said image data based on said image processing condition.

12. (Withdrawn - Previously Presented) The image processing apparatus as claimed in claim 1, further comprising:

an output condition setting unit for setting an image outputting condition based on said main subject information; and

an image data output unit for outputting said image data based on said image outputting condition.

13. (Withdrawn – Previously Presented) The image processing apparatus as claimed in claim 1, further comprising:

a selecting condition storing unit for storing a predetermined selecting condition of which said main subject should satisfy; and

an image selecting unit for selecting from a plurality of said image data input by said image data input unit, a desired image data, which includes a desired main subject satisfying said selecting condition.

14. (Previously Presented) The image processing apparatus as claimed in claim 1, wherein said image data input unit is an image capturing unit, which captures an image of said plurality of objects based on a photographic timing signal, comprising:

a timing condition storing unit for storing a predetermined photographic timing condition relating to said main subject; and

a timing signal output unit for outputting said photographic timing signal to said image capturing unit when said main subject satisfies said photographic timing condition.

15. (Withdrawn - Previously Presented) The image processing apparatus as claimed in claim 1, further comprising a distance measuring unit which comprises:

a light irradiating section for irradiating light to said plurality of objects; and

a calculating section for calculating a distance from said light irradiating section to said plurality of objects on the basis of the intensity of light reflected from said plurality of objects, wherein said distance measuring unit outputs a distance information to said range setting unit.

16. (Withdrawn) The image processing apparatus as claimed in claim 15, wherein said light irradiating section comprises a first light source irradiating light having a first wavelength and a second light source irradiating lights having a second and a third wavelengths, and said first and second light sources are located at an optically different positions.

17. (Withdrawn) The image processing apparatus as claimed in claim 16, wherein said first and second light sources irradiate lights at the same timing.

18. (Withdrawn – Previously Presented) The image processing apparatus as claimed in claim 17, further comprising:

an optically focusing section for focusing the lights irradiated by light irradiating unit and reflected from said plurality of objects;

a beam splitting section for optically splitting said reflected light into a first light having said first wavelength, a second light having said second wavelength and a third light having said third wavelength;

a light receiving section for receiving said reflected lights split by said beam splitting section; and

a light intensity detecting section for detecting a light intensity of said first, second and third reflected lights received by said light receiving section,

wherein said calculating section calculates out a distance from said plurality of objects on the basis of said light intensity detected by said light intensity detecting section.

19. (Withdrawn - Previously Presented) The image processing apparatus as claimed in claim 15, wherein said light irradiating section irradiates a light beam, further comprising:

a light beam scanning section for scanning around a startpoint said light beam toward a predetermined object within said plurality of objects; and

a reflected light beam detecting section for detecting light beams reflected by a target of said plurality of objects, wherein said calculating section comprises an integrating section for calculating an amount of integrated intensity of said reflected light beams from said target of said plurality of objects and a distance calculating section for calculating said distance on the basis of said integrated intensity and said peak intensity of said reflected light.

20. (Withdrawn) The image processing apparatus as claimed in claim 1, further comprising a mode selecting unit for selecting an operation mode corresponding to an intended object, wherein said range setting unit restricts said searching range on the basis of said selected operation mode, and said partial image extracting unit extracts said partial image on the basis of said selected operation mode.

21. (Withdrawn - Previously Presented) The image processing apparatus as claimed in claim 1 or 20, further comprising a display unit for displaying said partial image extracted by said partial image extracting unit and a changing section for changing a candidate of said main subject selected by said partial image extracting unit.

22. (Currently Amended) An image processing method, comprising:

inputting image data of a plurality of objects, the image data is generated by capturing one of the plurality of objects viewed from a plurality of different perspectives;

setting a searching range, which defines a depth length for searching for a main subject in said image data;

~~extracting, as a partial image, including said main subject~~ at least a portion of one of said plurality of objects from said image data based on depth distribution information indicating a distance to each of said plurality of objects included in said image data, a depth direction of said partial image being restricted to said searching range, the depth distribution information being calculated from said image data;

~~detecting said main subject in said partial image; and~~

receiving a predetermined main subject information relating to ~~the detected~~ said main subject; and

detecting whether said partial image is said main subject based on said predetermined main subject information, wherein

in searching for said main subject in said image data, extracting first, as the partial image, at least a portion of said one of said plurality of objects that is closest in distance in the depth direction.

23. (Currently Amended) The image processing method as claimed in claim 22, wherein:

said setting is a first setting of a first searching range as said searching range;

said extracting is a first extracting, as a first partial image, of at least a portion of one of said plurality of objects included in said first searching range, ~~as a first partial image; and~~

said detecting is a first detecting of ~~said main subject in~~ whether said first partial image is
said main subject, said detecting comprising:

a second setting of a second searching range as said searching range when said first
partial image is not ~~said main subject is not detected in said first partial image~~;

a second extracting, as a second partial image, of at least a portion of one of said plurality
of objects included in said second searching range ~~as a second partial image~~; and

a second detecting of ~~said main subject in~~ whether said second partial image is
said main object.

24. (Original) The image processing method as claimed in claim 23, wherein:

said first setting is a setting of the depth length that includes an independent
object existing at the nearest distance as said first searching range based on said depth
distribution information; and

said second setting is a setting of the depth length contiguous to said first
searching range, as said second searching range.

25. (Currently Amended) The image processing method as claimed in claim 22,
wherein:

said setting is a dividing the depth range that includes said plurality of objects in
said image data based on said depth distribution information and a setting of a plurality of
said searching range;

said extracting is a extracting from said image data, of at least one of said
plurality of objects included in each of a plurality of said searching range as a plurality of
said partial image images; and

~~said detecting is a~~ includes receiving a plurality of said main subject information
relating to each of a plurality of searching ranges and detecting of said main subject from
each of a said plurality of said partial image images; and

~~said receiving is a receiving of~~ based on said plurality of said main subject
information relating to said each of a plurality of the detected said searching range
ranges.

26. (Previously Presented) The image processing method as claimed in claim 22,
wherein said inputting is an inputting at an image capturing unit, which captures an
image of said plurality of objects, comprising:

deciding a photographic condition based on said main subject information; and
controlling an image capturing at said image capturing unit based on said
photographic condition.

27. (Withdrawn) The image processing method as claimed in claim 22, further
comprising:

setting an image processing condition based on said main subject information;
and
processing said image data based on said image processing condition.

28. (Withdrawn) The image processing method as claimed in claim 22, further
comprising:

setting an image outputting condition based on said main subject information;
outputting said image data based on said image outputting condition,

29. (Withdrawn) The image processing method as claimed in claim 22, further comprising:

storing a predetermined selecting condition relating to said main subject; and
selecting from a plurality of said image data input at said inputting, a desired image data that includes a desired main subject satisfying said selecting condition.

30. (Previously Presented) The image processing method as claimed in claim 22, wherein said inputting is a capturing of an image of said plurality of objects based on a photographic timing signal, further comprising:

storing a predetermined photographic timing condition relating to said main subject; and
outputting said photographic timing signal to said image capturing unit when said main subject satisfies said photographic timing condition.

31. (Withdrawn – Previously Presented) A recording medium, which records thereon a program for processing an image and can be read by a computer, comprising:

a module for inputting image data of a subject;
a module for setting a searching range, which defines the depth length for searching a main subject in said image data;

a module for extracting from said image data, part of said at least one of said plurality of objects included in said searching range as a partial image, based on depth distribution information showing the distance between a camera and said plurality of objects included in said image data;

a module for detecting said main subject from said partial image; and

a module for receiving predetermined main subject information relating to detected said main subject.

32. (Withdrawn) A computer program product comprising a recording medium, having recorded thereon a program for processing an image, by performing the operations of:

inputting image data of a plurality of objects;

setting a searching range, which defines the depth length for searching a main subject in said image data;

extracting a partial image including said main subject from said image data based on depth distribution information indicating a distance to each of said plurality of objects included in said image data, a depth direction of said partial image being restricted to said searching range;

detecting said main subject from said partial image; and

receiving predetermined main subject information relating to detected said main subject.